MULTIMEDIA UNIVERSITY®

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2019/2020

MVR2073 REALITY VIRTUALITY

(All Sections / Groups)

10 MARCH 2020
9:00 A.M – 11:00 A.M.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 6 pages with 15 objective questions and 10 subjective questions only.

2. Answer **ALL** questions in section **A** and **C**. Answer **FIVE** out of **SEVEN** question in section **B**. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the Answer Booklet provided.

Section A: Objective Questions **[Total: 15 Marks]**

1. Choose a best term that describes a field of technology which overlays digital information in real time on top of real world objects.
   A. Virtual Reality
   B. Internet of Things
   C. Augmented Reality
   D. Artificial Intelligence

2. Determine the difference between augmented reality and virtual reality.
   A. Both are the same.
   B. Augmented reality blends digital with real content while virtual reality invents digital environment.
   C. Virtual reality is for gaming while augmented reality is for educational tool.
   D. Virtual reality is only through wearable technology and augmented reality is only through mobile phone.

3. An example of active tracking technology is _____.
   A. Accelerometer
   B. Compass
   C. Marker-based tracking
   D. Global Positioning System

4. Markerless tracking does not use _____ to track objects.
   A. Edges
   B. Surface texture
   C. Artificial markers
   D. Interest points

5. _____ define what is interesting / stand out in an image.
   A. Keypoint
   B. Descriptor
   C. Orientation
   D. Database

6. Select a characteristic that marker tracking does not exhibits.
   A. Markers can be an eye-catcher.
   B. Markers usually work only when fully in view.
   C. Tracking is less demanding
   D. A database of keypoints must be stored/downloaded.

7. SLAM technology understands the physical world through feature points. SLAM stands for ?
   A. Simultaneous localization and mapping.
   B. Synchronous location and masking.
   C. Standard localization and mapping
   D. Sorting location and mapping

Continued .....

8. AR displays can be categorized according to the distance from eye to display as illustrated in Figure 1. Choose the correct label for I, II, III found in Figure 1.

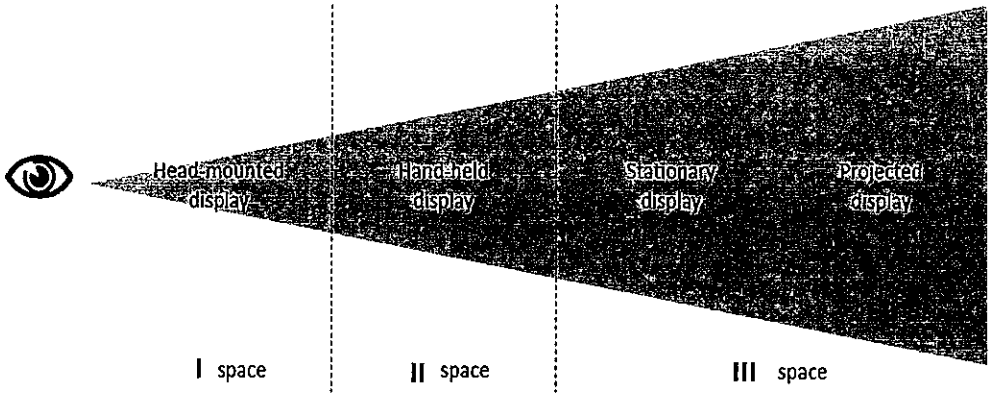

Figure 1

A. Head, Body, World
B. Body, Head, Universal
C. Head, Spatial, World
D. Head, World, Universal

9. The following are multi-modal input except:
A. Gesture
B. Speech
C. Smell
D. Hand

10. HTC Vive uses _____ sensor group arrangement as tracking system.
A. Inside out
B. Outside in
C. Balance in
D. Swipe out

11. Identify the tracking method that uses natural feature to track objects.
A. ARTag tracking
B. Markerless tracking
C. ARtoolKit tracking
D. Fiducial marker tracking

12. Possible challenges of using ARToolKit to track object are listed below except:
A. Image noise
B. Jittering
C. Sharp marker
D. Dark scene

13. Dynamic error in registration is mainly due to _____
A. Optical distortions
B. Mechanical misalignments
C. Tracker errors
D. System delays

Continued .....

14. Which of the following is not a characteristic of mechanical tracker?
    A. Signal strength falls off quadratically with distance.
    B. Freedom of operation is limited.
    C. High precision and fast.
    D. Expensive.

15. Identify a characteristic of VR from the given below.
    A. Non immersive.
    B. Small field of view.
    C. Requires rendering of realistic images.
    D. Registered virtual 3D content with real content.

Continued .....

Section B: Subjective Questions

Answer any 5 (FIVE) questions ONLY. **[Total: 10 Marks]**

1. Explain the term ***video see-through displays***.

[2 Marks]

2. Elaborate one disadvantage of using ***3D AR interface***.

[2 Marks]

3. Describe the term ***spatial augmented reality***.

[2 Marks]

4. List down two active tracking technologies.

[2 Marks]

5. One of the main components of AR navigation is ***wayfinding***. Explain the term ***wayfinding*** in your own words.

[2 Marks]

6. If virtual and real contents are not properly aligned during the registration process, it will break the illusion that the two coexist. Explain two factors that may contribute to ***static errors*** during the registration process.

[2 Marks]

7. Atmospheric distortion such as weather may affect the accuracy of Global Positioning System. Discuss a method to overcome the drop in accuracy caused by the atmospheric distortion.

[2 Marks]

Continued .....

Section C: Subjective Questions

Answer all questions. **[Total: 15 Marks]**

1. Oculus Quest uses ***inside-out*** tracking system. Describe the inside-out sensor group arrangement using a diagram and examine the characteristic of this arrangement.

[3 marks]

2. The following processes are important in AR. Describe in your own words for each of the process.

   i) Registration
   ii) Calibration
   iii) Tracking

[6 marks]

3. Explain the following multimodal displays:

   i) Haptic display
   ii) Olfactory display
   iii) Gustatory display

[6 marks]

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